

# A CONTACT ALGORITHM FOR THE SIGNORINI PROBLEM USING SPACE-TIME FINITE ELEMENTS

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The most common approach in the finite-element modelling of continuum systems over space and time is to employ the finite-element discretization over the spatial domain to reduce the problem to a system of ordinary differential equations in time. The desired time integration scheme can then be used to step across so-called time slabs, mesh configurations in which every element shares the same degree of time refinement. These techniques may become inefficient when the nature of the initial boundary value problem is such that a high degree of time refinement is required only in specific spatial regions of the mesh. Ideally one would be able to increase the time refinement only in those necessary regions. We achieve this flexibility by employing space-time elements with independent interpolation functions in both space and time. Our method is used to examine the classic contact problem of Signorini and allows us to increase the time refinement only in the spatial region adjacent to the contact interface. We also track the contact interface and compare our results with those of Hertz contact theory.